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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,083	11/21/2003	Young Sun Hwang	30205/39513	2261

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EXAMINER

GEORGE, PATRICIA ANN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 04/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

C-1

Office Action Summary	Application No.	Applicant(s)	
	10/719,083	HWANG ET AL.	
	Examiner	Art Unit	
	Patricia A. George	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4 and 6-9 is/are pending in the application.
- 4a) Of the above claim(s) 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4 and 6-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Amendment dated 01/17/2006 is acknowledged and filed. Claim 3 has been canceled, and the limitations of claim 3 have been incorporated into claim 1. Non-elected claim 3 has also been cancelled.

Claim Objections

The objection to claim 1 has been withdrawn as applicant has corrected the typo that was object.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4 and 6-9 are rejected under 35 U.S.C. 103(a) over Meador et al. of 193-nm Multilayer Imaging Systems [Proc. SPIE Vol. 5039, June 2003, Advances in

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Resist Technology and Processing XX; Theodore H. Fedynyshyn; Ed.] in view of Mizutani et al. of US 6,506,535.

Meador et al. discloses forming a tri-layer microlithography system using embedded etch masking layers (EMLs) and bottom antireflective coating (BARCs). (ab., 1.2-3) Meador et al. disclosed combining the EMLs with tri-layer BARCs results in outstanding Prolith simulated reflectance control. (ab. 1.9-10). Meador et al. teaches coating a BARC layer on a substrate layer (Fig.1 part: BARC); coating a middle layer (Fig.1, Part: M. LAYER) which includes using spin-on-glass (SOG), silicon containing polymers, and silicon dioxide chemical vapor deposition (CVD) films (Sec. 3, 1.2), all having high O₂ selectivities (Table.3), which illustrates the film absorbing gas (i.e. wherein the gas protecting film is capable of absorbing the silicon gas) generated from the photo resist film upon exposure to light, and is *also evidenced by Hayase et al.* (US 5, 702,776 col.4, 1.9-12). Meador et al. teaches coating the middle layer with one of a wide variety of 193-nm photo resist materials (sec. 3.2); performing a photolithography process on the resulting structure to form a photo resist film pattern (Fig. 1); etching the etching mask layer of claimed step (b) using the photo resist film pattern as an etching mask to form an etching mask pattern (Fig. 1); and forming an underlying layer pattern by an etching process using the etching mask pattern (Fig. 1). Meador et al. discloses the middle layer is selected from PGMEA (sec. 3.1.3, 1.5-6), which is not of the group of poly acrylic/vinyl materials listed in claims 6 and 9.

With respect to claim 1, the reference of Meador fails to disclose a protection film that absorbs silicon gas generated from the photo resist.

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Mizutani et al. teaches methods of use for photoresist compositions with ArF and VUV (col. 108, l.10-15) PGMEA (see Table I-2), and methyl acrylate (see col.108, l. 50-55 and example 1) as in claims 6 and 9, that applicants' illustrate, a water-soluble polymer that absorbs silicon containing gas generated by the photoresist, as in claim 1.

It would have been obvious to one of ordinary skill in the art at the time of invention was made, to substitute the poly acrylic/vinyl materials illustrated by applicants to absorb silicon gas generated by the photoresist, of Mizutani, for the PGMEA, as used by Meador, with because Mizutani et al. illustrates it is a known material used for the same functional results which makes it a substitutable poly acrylic materials.

As for claims 4 and 7, Meador et al. anticipated the photo resist composition is for a process employing a light source of 193-nm Imaging Systems (ti.).

As for claim 8, Meador et al. anticipated spin coating and hot plate baking the coated compositions (ab. l.3).

Claim Rejections - 35 USC § 103

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meador et al. (see discussion above) in view of Shibata et al. of Material and Process Development of Tri-level Resist System in KrF and ArF Lithography [Proc. SPIE Vol. 4690, July 2002, Advances in Resist Technology and Processing XIX; Theodore H. Fedynyshyn; Ed.].

Meador et al. fails to teach the tri-level etching mask layers are formed by use of KrF photo resists, as in claim 2.

As for claim 2, Shibata et al. clearly teaches the tri-level etching mask layers are formed by spin coating a KrF photo resist layer system (ab., 1.7-8).

It would have been obvious to one of ordinary skill in the art at the time of invention was made, to include the use of KrF resists, as taught by Shibata, when forming the tri-level resist system of, Meador, because Shibata teaches the KrF tri-level system provides greater excellent dry etch resistance because of the high carbon (90%) content (see abstract).

Response to Arguments

The applicants' argument filed on 1/17/2006 *care* *Re 1131* is persuasive with respect to the fact that Meador fails to disclose the absorption of silicon containing gas from the photo resist film. As a result, the previous 102 rejection over Meador is withdrawn, and a modified 103 rejection is included to address applicant's new amendments.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: USPN 5,702,776 teaches organic polysilane materials absorbs energy of UV rays, and oxidizes by absorbing oxygen; USPN 5,959,298 teaches tri-level resists; High Performance 193-nm Positive Resist Using Alternating Polymer Systems

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of Functionalized Cyclic Olefins/Maleic Anhydride [Proc. of SPIE conf. Vol. 3999, March 2000, and published by JRS Corporation in 2002], and USPN 5,962,191 all teach KrF photo resists are water-soluble.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia A. George whose telephone number is (571)272-5955. The examiner can normally be reached on weekdays between 7:00am and 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571)272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


PAG
0306

Patricia A George
Examiner
Art Unit 1765

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER

